

## PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

To:

LE ROUX, Marius  
D.M. Kisch Inc.  
P.O. Box 781218  
2146 Sandton  
AFRIQUE DU SUD

Date of mailing (day/month/year) 03 July 2000 (03.07.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference PCT/1999/014	
International application No. PCT/IB99/01700	International filing date (day/month/year) 18 October 1999 (18.10.99)

## 1. The following indications appeared on record concerning:

☒ the applicant
 ☐ the inventor
 ☐ the agent
 ☐ the common representative

## Name and Address

 RADICAL WATERS (PTY) LIMITED  
 3/458 West Street  
 Glen Austen Extension 3  
 1685 Midrand  
 South Africa

## State of Nationality

ZA

## State of Residence

ZA

## Telephone No.

(27)(11) 805 2683

## Facsimile No.

(27)(11) 312 1129

## Teleprinter No.

## 2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person
 ☐ the name
 ☐ the address
 ☐ the nationality
 ☐ the residence

## Name and Address

 RADICAL WATERS IP (PTY) LIMITED  
 3/458 West Street  
 Glen Austen Extension 3  
 1685 Midrand  
 South Africa

## State of Nationality

ZA

## State of Residence

ZA

## Telephone No.

(27)(11) 805 2683

## Facsimile No.

(27)(11) 312 1129

## Teleprinter No.

## 3. Further observations, if necessary:

## 4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input checked="" type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input type="checkbox"/> the elected Offices concerned
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

 The International Bureau of WIPO  
 34, chemin des Colombettes  
 1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Ingrid Aulich

Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
 United States Patent and Trademark  
 Office  
 Box PCT  
 Washington, D.C. 20231  
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 11 July 2000 (11.07.00)	
<b>International application No.</b> PCT/IB99/01700	<b>Applicant's or agent's file reference</b> PCT/1999/014
<b>International filing date (day/month/year)</b> 18 October 1999 (18.10.99)	<b>Priority date (day/month/year)</b> 23 October 1998 (23.10.98)
<b>Applicant</b> HINZE, Gilbert, Theo	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

22 May 2000 (22.05.00)

☐ in a notice effecting later election filed with the International Bureau on:
2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No.: (41-22) 740.14.35	<b>Authorized officer</b>  Pascal Piriou  Telephone No.: (41-22) 338.83.38
--	--

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

## PCT

### NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

To:

LE ROUX, MARIUS  
D.M. KISCH Inc.  
P.O. Box 781218  
SANDTON 2146  
AFRIQUE DU SUD

Date of mailing  
(day/month/year) 12.02.2001

Applicant's or agent's file reference  
PCT/1999/014

#### IMPORTANT NOTIFICATION

International application No.  
PCT/IB99/01700

International filing date (day/month/year)  
18/10/1999

Priority date (day/month/year)  
23/10/1998

Applicant  
RADICAL WATERS (PTY.) LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office  
D-80298 Munich  
Tel. +49 89 2399 - 0 Tx: 523656 epmu d  
Fax: +49 89 2399 - 4465

Authorized officer

Baillou, V


Tel. +49 89 2399-8236



## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT/1999/014		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IB99/01700	International filing date (day/month/year) 18/10/1999	Priority date (day/month/year) 23/10/1998	
International Patent Classification (IPC) or national classification and IPC A23L3/005			
Applicant RADICAL WATERS (PTY.) LIMITED et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input checked="" type="checkbox"/> Certain defects in the international application</p> <p>VIII <input checked="" type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand  22/05/2000		Date of completion of this report  12.02.2001	
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer  Adechy, M  Telephone No. +49 89 2399 8576	



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB99/01700

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*:

### Description, pages:

1-18 as originally filed

### Claims, No.:

1-16 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB99/01700

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## **V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

### **1. Statement**

Novelty (N)	Yes:	Claims	
	No:	Claims	1-16
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-16
Industrial applicability (IA)	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations  
**see separate sheet**

## **VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

## **VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IB99/01700

**Re Item V**

**Reasoned statement under Art. 35 (2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1) Reference is made to the following document:**

- D1: EP-A-0 802 164 (MORINAGA ENGINEERING CO LTD ;MORINAGA MILK INDUSTRY CO LTD (JP)) 22 October 1997 (1997-10-22)
- D2: DATABASE WPI Section Ch, Week 198113 Derwent Publications Ltd., London, GB; Class A97, AN 1981-22787D XP002130880 & SU 747 828 B (VESELOV YU S), 25 July 1980 (1980-07-25)
- D3: DATABASE WPI Section Ch, Week 199333 Derwent Publications Ltd., London, GB; Class D13, AN 1993-263108 XP002130881 & SU 1 752 401 A (MOSKOVSKOE ASSEMBLY MANAGEMENT), 7 August 1992 (1992-08-07)
- D4: PATENT ABSTRACTS OF JAPAN vol. 1995, no. 11, 26 December 1995 (1995-12-26) & JP 07 218062 A (OKAMOTO:KK), 18 August 1995 (1995-08-18)
- D6: DATABASE WPI Section Ch, Week 199439 Derwent Publications Ltd., London, GB; Class D13, AN 1994-312796 XP002130883 & JP 06 237747 A (HOSHIZAKI ELECTRIC CO LTD), 30 August 1994 (1994-08-30)

**2) Novelty Art. 33 (1) and (2) PCT**

The subject matter of Claims 1, 2, 3 and 4 is not regarded as novel in the light of D4 , which discloses the use of a bactericidal solution for industrial transportation of fresh produce. It is implicit from the said document that "a container" is treated with the bactericidal solution. It is also mentioned that such a solution is used in industrial applications. The subject matter of Claims 1 is also known from D1 (p. 2 lines 1-14), D3 and D6.

The subject matter of dependent Claims 5, 6 and 10, containing additional features of the form of the bactericidal solution (i.e. ice form), is also known from D4.

The subject matter of dependent Claims 7, 8, 9, 12, 13 and 14 is known from prior art D3. It should be noted that the feature of "the solution is produced from an about 3 to

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/IB99/01700

10% aqueous salt solution" (in claim 8) is vague and the said document discloses a solution of 0.3 to 0.9 % which can be made from a solution of 3 to 10% as claimed. The subject matter of Claim 13 is also disclosed in D6.

The subject matter of dependent Claims 11 is known from D3. It is implicit that the disclosed compound is labile. The fact that the compounds disappear after 96 hours, producing low residue, is not seen as a technical feature but as the effect produced.

The subject matter of dependent Claim 15 is not regarded as novel as it is found in prior art D6, where such component is disclosed (e.g. hypochlorous acid).

The subject matter of dependent Claim 16 is not regarded as novel as the additional feature of "...are adjustable to be suitable for the particular application" are broad and unclear and therefore are not taken into account for novelty evaluation. The subject matter of the said claim is not regarded as novel as for claim 1.

**3) Inventive step Art. 33 (1) and (3) PCT**

Claims 1-16 do not fulfill the requirements of Art. 33 (1) - (3) PCT.

**Re Item VII**

**Certain defects in the international application**

There is a typing mistake in Claims 6 ("...as claimed I claim 3...").

**Re Item VIII**

**Certain observations on the international application**

1) Term such as "the spirit of the invention" on page 13 of the description is not clear (Art 5 PCT).

2) No reference is made to any of the relevant prior art documents as required by Rule 5.1 (a) ii PCT.

3) The subject matter of claim 16 is not clear and not defined in terms of technical



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/IB99/01700

features (Art. 6 PCT).

4) Expression such as "about" as in claim 8 is not clear (Art. 6 PCT).

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 99/01700

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A23L3/005

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 802 164 A (MORINAGA ENGINEERING CO LTD ;MORINAGA MILK INDUSTRY CO LTD (JP)) 22 October 1997 (1997-10-22)	1-16
Y	page 1, line 5 - line 14 page 6, line 54 - line 55	1-16
X	DATABASE WPI Section Ch, Week 198113 Derwent Publications Ltd., London, GB; Class A97, AN 1981-22787D XP002130880 & SU 747 828 B (VESELOV YU S), 25 July 1980 (1980-07-25) abstract	1-4, 10-12, 15, 16

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

18 February 2000

Date of mailing of the international search report

29/02/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer:

Bendl, E

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 99/01700

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE WPI  Section Ch, Week 199333  Derwent Publications Ltd., London, GB;  Class D13, AN 1993-263108  XP002130881  &amp; SU 1 752 401 A (MOSKOVSKOE ASSEMBLY  MANAGEMENT), 7 August 1992 (1992-08-07)  abstract</p>	1,2,7-16
Y	<p>-----  PATENT ABSTRACTS OF JAPAN  vol. 1995, no. 11,  26 December 1995 (1995-12-26)  &amp; JP 07 218062 A (OKAMOTO:KK),  18 August 1995 (1995-08-18)  abstract</p>	1-16
X	<p>-----  PATENT ABSTRACTS OF JAPAN  vol. 1995, no. 11,  26 December 1995 (1995-12-26)  &amp; JP 07 218062 A (OKAMOTO:KK),  18 August 1995 (1995-08-18)  abstract</p>	1-6,10, 11,16
X	<p>-----  DATABASE WPI  Section Ch, Week 199624  Derwent Publications Ltd., London, GB;  Class B06, AN 1996-237818  XP002130882  &amp; RU 2 045 480 C (RYASNOV N I),  10 October 1995 (1995-10-10)  abstract</p>	1-16
X	<p>-----  DATABASE WPI  Section Ch, Week 199439  Derwent Publications Ltd., London, GB;  Class D13, AN 1994-312796  XP002130883  &amp; JP 06 237747 A (HOSHIZAKI ELECTRIC CO  LTD), 30 August 1994 (1994-08-30)  abstract</p>	1,2,7-16
Y	<p>-----  PATENT ABSTRACTS OF JAPAN  vol. 1997, no. 04,  30 April 1997 (1997-04-30)  &amp; JP 08 323307 A (TOTO LTD),  10 December 1996 (1996-12-10)  abstract</p>	1-16
X	<p>-----  PATENT ABSTRACTS OF JAPAN  vol. 1997, no. 11,  28 November 1997 (1997-11-28)  &amp; JP 09 187770 A (NAKAMURA  TADAMASA;ZENKOKU MOKKO KIKAIKAN:KK),  22 July 1997 (1997-07-22)  abstract</p>	1-16
E	<p>-----  &amp; US 5 858 202 A (NAKAMURA)  column 1 -column 4</p>	1-16

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>PCT/1999/014</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/IB 99/ 01700</b>	International filing date (day/month/year) <b>18/10/1999</b>	(Earliest) Priority Date (day/month/year) <b>23/10/1998</b>
Applicant  <b>RADICAL WATERS (PTY.) LIMITED et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

**BACTERICIDAL TREATMENT OF FOOD STORAGE CONTAINERS BY USING ELECTROCHEMICALLY ACTIVATED BACTERICIDAL AQUEOUS SOLUTION**

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☒ None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 99/01700

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A23L3/005

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 802 164 A (MORINAGA ENGINEERING CO LTD ; MORINAGA MILK INDUSTRY CO LTD (JP)) 22 October 1997 (1997-10-22)	1-16
Y	page 1, line 5 - line 14 page 6, line 54 - line 55 ---	1-16
X	DATABASE WPI Section Ch, Week 198113 Derwent Publications Ltd., London, GB; Class A97, AN 1981-22787D XP002130880 & SU 747 828 B (VESELOV YU S), 25 July 1980 (1980-07-25) abstract --- -/--	1-4, 10-12, 15, 16

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

18 February 2000

Date of mailing of the international search report

29/02/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Bendl, E

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 99/01700

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE WPI Section Ch, Week 199333 Derwent Publications Ltd., London, GB; Class D13, AN 1993-263108 XP002130881 &amp; SU 1 752 401 A (MOSKOVSKOE ASSEMBLY MANAGEMENT), 7 August 1992 (1992-08-07) abstract</p> <p>---</p>	1,2,7-16
Y		1-16
X	<p>PATENT ABSTRACTS OF JAPAN vol. 1995, no. 11, 26 December 1995 (1995-12-26) &amp; JP 07 218062 A (OKAMOTO:KK), 18 August 1995 (1995-08-18) abstract</p> <p>---</p>	1-6,10, 11,16
X	<p>DATABASE WPI Section Ch, Week 199624 Derwent Publications Ltd., London, GB; Class B06, AN 1996-237818 XP002130882 &amp; RU 2 045 480 C (RYASNOV N I), 10 October 1995 (1995-10-10) abstract</p> <p>---</p>	1-16
X	<p>DATABASE WPI Section Ch, Week 199439 Derwent Publications Ltd., London, GB; Class D13, AN 1994-312796 XP002130883 &amp; JP 06 237747 A (HOSHIZAKI ELECTRIC CO LTD), 30 August 1994 (1994-08-30) abstract</p> <p>---</p>	1,2,7-16
Y	<p>PATENT ABSTRACTS OF JAPAN vol. 1997, no. 04, 30 April 1997 (1997-04-30) &amp; JP 08 323307 A (TOTO LTD), 10 December 1996 (1996-12-10) abstract</p> <p>---</p>	1-16
X	<p>PATENT ABSTRACTS OF JAPAN vol. 1997, no. 11, 28 November 1997 (1997-11-28) &amp; JP 09 187770 A (NAKAMURA TADAMASA;ZENKOKU MOKKO KIKAIKAN:KK), 22 July 1997 (1997-07-22) abstract</p> <p>---</p>	1-16
E	<p>&amp; US 5 858 202 A (NAKAMURA) column 1 -column 4</p> <p>-----</p>	1-16

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 99/01700

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0802164	A	22-10-1997	WO 9717298 A	15-05-1997
			JP 10128336 A	19-05-1998
SU 747828	B		NONE	
SU 1752401	A	07-08-1992	NONE	
JP 07218062	A	18-08-1995	NONE	
RU 2045480	C	10-10-1995	NONE	
JP 6237747	A	30-08-1994	NONE	
JP 08323307	A	10-12-1996	NONE	
JP 09187770	A	22-07-1997	US 5858202 A	12-01-1999

# XP-002130880

AN - 1981-22787D [13]  
A - [001] 011 04- 055 056 393 491 50- 61- 623 627 641 678 688 720 722  
CPY - VESE-I  
DC - A97 D15 X25  
FS - CPI;EPI  
IC - B01D35/06 ; C02C5/12  
IN - LAVROV I S; TIMOFEEV V N; VESELOV Y U S  
KS - 0231 0304 2536 2540 2541 2708 2743 2763 2857  
MC - A12-E A12-S01 A12-W11 D04-A01  
- X25-H09  
PA - (VESE-I) VESELOV YU S  
PN - SU747828 B 19800725 DW198113 000pp  
PR - SU19782623155 19780602  
XIC - B01D-035/06 ; C02C-005/12  
AB - SU-747828 The portable appts. is used for supplying potable water. It can be used for expeditions in remote regions or in cases of natural disasters, etc., using any sources of contaminated water. It has improved compactness. The appts. contains external spherical chambers made from dielectric material. The external sphere contains perforated removable bottom and has its inner surface covered with metal netting from electrolytically undissolvable material (e.g. platinum plated titanium wire), and is half-filled with polydispersed floating charge, e.g. foamed polystyrene. The internal perforated sphere is covered with the same metal netting and filled with charge of activated carbon. It also contains additional central spherical electrodes, which, together with the metal nettings of the chambers, is connected to the terminals of storage battery (or electric generator). Both spherical chambers are fixed to sectional handle-tube, in which is mounted the UV lamp, and which is connected through the electric pump to the tank of potable water. All components of the appts. are contained in a box with carrying handle. Bul.20/15.7.80.  
IW - PORTABLE APPARATUS PURIFICATION DRINK WATER CONTAIN TWO SPHERE CHAMBER ELECTRODE FILTER CHARGE ACTIVATE CARBON BACTERIA ULTRAVIOLET LAMP  
IKW - PORTABLE APPARATUS PURIFICATION DRINK WATER CONTAIN TWO SPHERE CHAMBER ELECTRODE FILTER CHARGE ACTIVATE CARBON BACTERIA ULTRAVIOLET LAMP  
INW - LAVROV I S; TIMOFEEV V N; VESELOV Y U S  
NC - 001  
OPD - 1978-06-02  
ORD - 1980-07-25  
PAW - (VESE-I) VESELOV YU S  
TI - Portable appts. for purificn. of drinking water - contains two spherical chambers with electrodes, filtering charge, activated carbon and bactericidal UV lamp



# XP-002130881

AN - 1993-263108 [33]  
AP - SU19864131966 19861020  
CPY - MOSK-R  
- POUL-R  
DC - D13 D22 P34  
FS - CPI;GMPI  
IC - A61L2/18  
IN - FISININ V I; PISKUNOV B A; SPEKTOR L E  
MC - D03-H01 D09-A02  
PA - (MOSK-R) MOSKOVSKOE ASSEMBLY MANAGEMENT  
- (POUL-R) POULTRY RES TECHN INST  
PN - SU1752401 A1 19920807 DW199333 A61L2/18 003pp  
PR - SU19864131966 19861020  
XA - C1993-117491  
XIC - A61L-002/18  
XP - N1993-201601  
AB - SU1752401 Mineralised water, e.g. 0.3-0.9% NaCl or KCl soln. is electrolysed in a cell fitted with a diaphragm. The eggs are first immersed for 1-3 min. in the water from cathodic compartment of pH 9.5-11 and redox potential of  $-(600-900)$  mV. Subsequent deep disinfection is carried out by immersing the eggs for 0.6-1.5 min. in the water from anodic compartment of pH 2-1.2 and redox potential of  $+(1000-1200)$  mV. The treatment generates, at the egg surface, powerful disinfectants such as Na, K and Ca hypochlorites.  
- USE/ADVANTAGE - Farm eggs are disinfected more efficiently. Increased efficiency of treatment. The hypochlorites formed retain their bactericidal properties for 21-25 days. Bul.29/7.8.9 (Dwg.0/0)  
IW - TREAT FARM EGG WATER ELECTROLYTIC CELL DIAPHRAGM CATHODE ZONE PRELIMINARY DISINFECT ANODE ZONE DEEP DISINFECT  
IKW - TREAT FARM EGG WATER ELECTROLYTIC CELL DIAPHRAGM CATHODE ZONE PRELIMINARY DISINFECT ANODE ZONE DEEP DISINFECT  
INW - FISININ V I; PISKUNOV B A; SPEKTOR L E  
NC - 001  
OPD - 1986-10-20  
ORD - 1992-08-07  
PAW - (MOSK-R) MOSKOVSKOE ASSEMBLY MANAGEMENT  
- (POUL-R) POULTRY RES TECHN INST  
TI - Treatment of farm eggs - uses water previously electrolysed in cell with diaphragm, from cathodic zone for preliminary disinfection and from anodic zone for deep disinfection

PUBLICATION NUMBER : 07218062  
 PUBLICATION DATE : 18-08-95

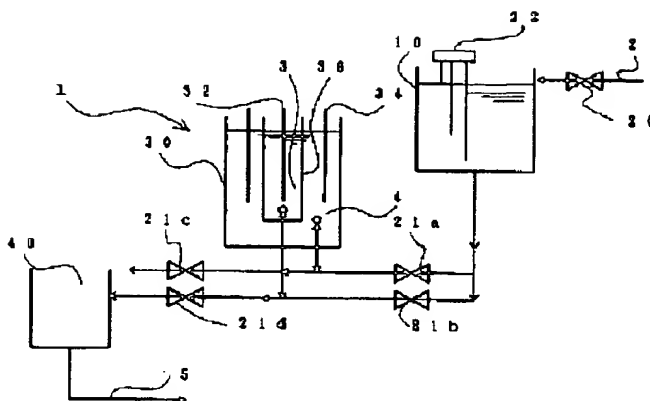
APPLICATION DATE : 28-01-94  
 APPLICATION NUMBER : 06024890

APPLICANT : OKAMOTO:KK;

INVENTOR : OKAMOTO KIMIO;

INT.CL. : F25C 1/00 C02F 1/46

TITLE : PREPARATION AND DEVICE FOR  
 ELECTROLYTIC ACIDIC ION ICE AND  
 ELECTROLYTIC ACIDIC WATER



ABSTRACT : PURPOSE: To prepare electrolytic acidic ion ice in a big quantity by freezing acidic ion water having bactericidal action in the industrial amount by separating and forming tap water into electrolytic acidic ion water by an electrolytic bath, and automatically and sequentially forming the acidic ion water into ice.

CONSTITUTION: A water storage tank 10 for storing water after introducing tap water (city water) 2 to be used as raw water is provided, and the raw water is transferred into an electrolytic bath 30. The electrolytic bath 30 is provided with a positive electrode 32 and a negative electrode 34, and a diaphragm 36 is provided between the positive electrode 32 and the negative electrode 34, so that acidic water (electrolytic acidic water) 3 to be prepared on the positive electrode 32 side and alkali water 4 to be prepared on the negative electrode 34 side may be separately taken out. The acidic ion water 3 prepared in the electrolytic bath 30 is fed into an ice making device 40, and automatic ice making is performed in the specific limited time therein, and electrolytic acidic ion ice 5 is prepared. The formed ice is used for transportation of fresh fishes and fresh meats and for maintenance of the freshness for the industrial purpose.

COPYRIGHT: (C) JPO

# XP-002130882

AN - 1996-237818 [24]  
AP - SU19925036886 19920414  
CPY - RYAS-I  
DC - B06 C03 D13 D15 J03 X25  
DR - 1740-P  
FS - CPI;EPI  
IC - C02F1/461  
IN - RYASNOV N I  
MC - B11-C09 B14-A01 C11-C09 C14-A01 C14-V02 D03-H02 D04-A01M J03-B  
- X25-R  
M2 - [01] C101 C108 C550 C730 C800 C801 C802 C804 C805 C807 M411 M720 M903  
M904 M910 N120 N513 N520 P200 Q225 Q435; R01740-P; 1740-P  
M3 - [02] C101 C108 C550 C730 C800 C801 C802 C804 C805 C807 M411 M720 M903  
M904 M910 N120 N513 N520 P200 Q225 Q435; R01740-P; 1740-P  
PA - (RYAS-I) RYASNOV N I  
PN - RU2045480 C1 19951010 DW199624 C02F1/461 004pp  
PR - SU19925036886 19920414  
XA - C1996-075834  
XIC - C02F-001/461  
AB - RU2045480 The process includes preparing 0.5% alkaline soln. with distilled water, heating in chamber with electrodes one above another to 80-85deg.C with potential on electrodes 1400-1500V and electric current 4-5A to the appearance of glowing corona discharge, decreasing electric current, adding alkaline soln. at the rate of 180-190 ml/min. under pressure of 10-15 mmHg, further decreasing electric current to 0.5A when the potential on electrodes is reduced to 650-700V, activating alkaline soln. with electroprocessing and heating by d.c. electric current.  
- USE - The process is used in the prepn. of activated liq. media, in particular water by electrolysis, useful in health protection, cure of infections, food-processing industry in conserving of produce, fruits, vegetables, in agriculture for disinfection of seeds prior to sowing, and in veterinary medicine for curing infective diseases in animals.  
- ADVANTAGE - Stable bactericidal properties of activated liq. medium are obtd. due to stability of electric discharge with continuous flow of liq.  
- (Dwg.1/1)  
AW - HEALTH PROTECTION CONSERVATION FRUITS VEGETABLES DISINFECTION SEEDS  
AKW - HEALTH PROTECTION CONSERVATION FRUITS VEGETABLES DISINFECTION SEEDS  
CN - R01740-P  
DRL - 1740-P  
IW - ACTIVATE LIQUID MEDIUM WATER ELECTROLYTIC PREPARATION AQUEOUS ALKALINE SOLUTION HEAT CHAMBER ELECTRODE CONNECT CIRCUIT VOLTAGE CURRENT VARIABLE SPECIFIED MODE  
IKW - ACTIVATE LIQUID MEDIUM WATER ELECTROLYTIC PREPARATION AQUEOUS ALKALINE SOLUTION HEAT CHAMBER ELECTRODE CONNECT CIRCUIT VOLTAGE CURRENT VARIABLE SPECIFIED MODE  
INW - RYASNOV N I  
NC - 001  
OPD - 1992-04-14  
ORD - 1995-10-10

# XP-002130883

AN - 1994-312796 [39]

AP - JP19930028994 19930218

CPY - HOSH-N

DC - D13 J03 X25

FS - CPI;EPI

IC - A23B4/023 ; A23B7/158 ; A23L3/34 ; A23L3/3589 ; C01B11/06

MC - D04-A01M D04-A02 D04-B07F J03-B

- X25-H03 X25-R06

PA - (HOSH-N) HOSHIZAKI ELECTRIC CO LTD

PN - JP6237747 A 19940830 DW199439 A23L3/34 006pp

PR - JP19930028994 19930218

XA - C1994-142002

XIC - A23B-004/023 ; A23B-007/158 ; A23L-003/34 ; A23L-003/3589 ; C01B-011/06

XP - N1994-246102

AB - J06237747 Prepn. comprises: (a) electrolysing brine in a first electrolytic tank having an anode chamber and a cathode chamber partitioned by a diaphragm; and (b) electrolysing generated water having residual brine in the cathode chamber in a sec. electrolytic tank having no anode chamber or cathode chamber.

- The equipment has: (a) the first electrolytic tank where, brine is supplied to the anode chamber and the cathode chamber, and (b) the sec. electrolytic tank where, the water generated in the first electrolytic tank is supplied to the second electrolytic tank.

- USE/ADVANTAGE - The method and the equipment are used for prepg. the treating soln. for sterilisation. The method produces alkaline water contg. hypochlorous acid, or sodium hypochlorite. The generated water has high bactericidal action.

- (Dwg.1/3)

IW - PREPARATION TREAT SOLUTION STERILE ELECTROLYTIC BRINE ELECTROLYTIC TANK ELECTROLYTIC GENERATE WATER RESIDUE BRINE CATHODE CHAMBER ELECTROLYTIC TANK

IKW - PREPARATION TREAT SOLUTION STERILE ELECTROLYTIC BRINE ELECTROLYTIC TANK ELECTROLYTIC GENERATE WATER RESIDUE BRINE CATHODE CHAMBER ELECTROLYTIC TANK

NC - 001

OPD - 1993-02-18

ORD - 1994-08-30

PAW - (HOSH-N) HOSHIZAKI ELECTRIC CO LTD

TI - Prepn. of treating soln. for sterilisation - by electrolysing brine in 1st electrolytic tank and electrolysing generated water having residual brine in cathode chamber of 2nd electrolytic tank

PUBLICATION NUMBER : 08323307  
PUBLICATION DATE : 10-12-96

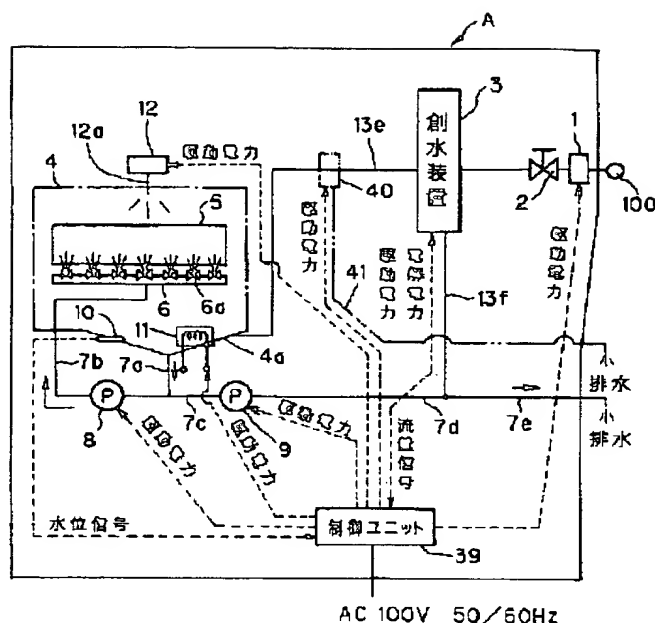
APPLICATION DATE : 28-03-96  
APPLICATION NUMBER : 08099304

APPLICANT : TOTO LTD;

INVENTOR : ANDO SHIGERU;

INT.CL. : B08B 3/08 C02F 1/46 C11D 7/04 //  
A47L 15/42

TITLE : APPLIANCE WASHING DEVICE

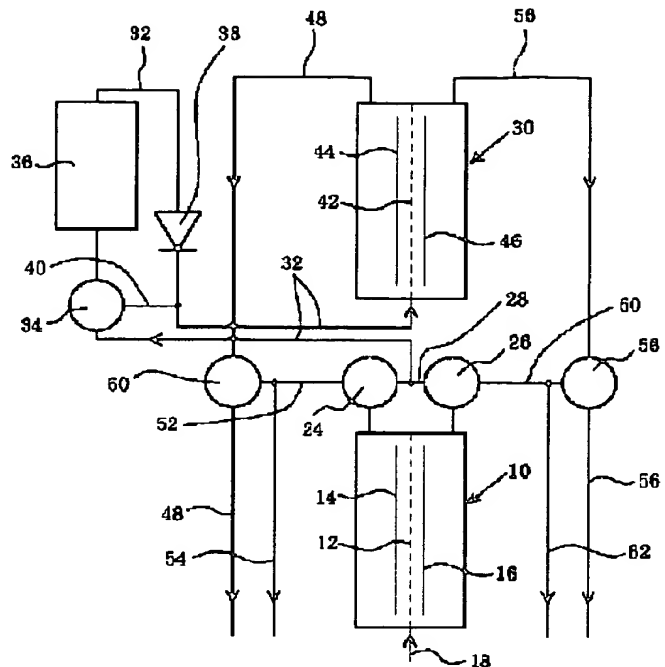


**ABSTRACT :** PURPOSE: To assure a sufficient washing capacity to stains of a fat and oil system and a protein system and sufficient sterilizing capacity by having an electrolytic cell and an electrolytic material adder to add an electrolytic material to fresh water and providing the device with a water generator capable of forming high-alkalinity water and strongly acidic water, etc.

**CONSTITUTION:** Used appliances are stowed into an appliance stowage cage 5 and a washing tank 5 is hermetically sealed in order to wash the appliances with the appliance washing device A. A solenoid valve 1 is opened by a controller 39 and driving voltage and electrolytic voltage are supplied to the water generator 3. DC voltage is impressed to respective electrodes to operate the water generator 3 with a strongly alkaline water discharge mode. Further, the strongly alkaline water formed in the water generator 3 is supplied at a prescribed rate through a first formed water discharge pipe 13e to the washing tank 4. A pump 8 is thereafter driven by the controller 39 to admit the strongly alkaline water through a pipeline 7a, the pump 8 and a pipeline 7 to an injector 6 by which the water is injected diagonally upward from injection nozzles 6a. As a result, the stains sticking to the appliances are decomposed and washed away.

**COPYRIGHT:** (C) JPO

TITLE : METHOD FOR FORMING  
ELECTROLYZED WATER AND ITS  
APPARATUS



COPYRIGHT: (C) JPO



PATENT COOPERATION TREATY

PCT

REC'D 15 FEB 2001

WIPO

PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT/1999/014	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IB99/01700	International filing date (day/month/year) 18/10/1999	Priority date (day/month/year) 23/10/1998
International Patent Classification (IPC) or national classification and IPC A23L3/005		
Applicant RADICAL WATERS (PTY.) LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 6 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  22/05/2000	Date of completion of this report  12.02.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Adechy, M  Telephone No. +49 89 2399 8576 

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB99/01700

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

### Description, pages:

1-18 as originally filed

### Claims, No.:

1-16 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB99/01700

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-16
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-16
Industrial applicability (IA)	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations  
**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**

**Re It m V**

**Reasoned statement under Art. 35 (2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1) Reference is made to the following document:**

- D1: EP-A-0 802 164 (MORINAGA ENGINEERING CO LTD ;MORINAGA MILK INDUSTRY CO LTD (JP)) 22 October 1997 (1997-10-22)
- D2: DATABASE WPI Section Ch, Week 198113 Derwent Publications Ltd., London, GB; Class A97, AN 1981-22787D XP002130880 & SU 747 828 B (VESELOV YU S), 25 July 1980 (1980-07-25)
- D3: DATABASE WPI Section Ch, Week 199333 Derwent Publications Ltd., London, GB; Class D13, AN 1993-263108 XP002130881 & SU 1 752 401 A (MOSKOVSKOE ASSEMBLY MANAGEMENT), 7 August 1992 (1992-08-07)
- D4: PATENT ABSTRACTS OF JAPAN vol. 1995, no. 11, 26 December 1995 (1995-12-26) & JP 07 218062 A (OKAMOTO:KK), 18 August 1995 (1995-08-18)
- D6: DATABASE WPI Section Ch, Week 199439 Derwent Publications Ltd., London, GB; Class D13, AN 1994-312796 XP002130883 & JP 06 237747 A (HOSHIZAKI ELECTRIC CO LTD), 30 August 1994 (1994-08-30)

**2) Novelty Art. 33 (1) and (2) PCT**

The subject matter of Claims 1, 2, 3 and 4 is not regarded as novel in the light of D4 , which discloses the use of a bactericidal solution for industrial transportation of fresh produce. It is implicit from the said document that "a container" is treated with the bactericidal solution. It is also mentioned that such a solution is used in industrial applications. The subject matter of Claims 1 is also known from D1 (p. 2 lines 1-14), D3 and D6.

The subject matter of dependent Claims 5, 6 and 10, containing additional features of the form of the bactericidal solution (i.e. ice form), is also known from D4.

The subject matter of dependent Claims 7, 8, 9, 12, 13 and 14 is known from prior art D3. It should be noted that the feature of "the solution is produced from an about 3 to

10% aqueous salt solution" (in claim 8) is vague and the said document discloses a solution of 0.3 to 0.9 % which can be made from a solution of 3 to 10% as claimed. The subject matter of Claim 13 is also disclosed in D6.

The subject matter of dependent Claims 11 is known from D3. It is implicit that the disclosed compound is labile. The fact that the compounds disappear after 96 hours, producing low residue, is not seen as a technical feature but as the effect produced.

The subject matter of dependent Claim 15 is not regarded as novel as it is found in prior art D6, where such component is disclosed (e.g. hypochlorous acid).

The subject matter of dependent Claim 16 is not regarded as novel as the additional feature of "...are adjustable to be suitable for the particular application" are broad and unclear and therefore are not taken into account for novelty evaluation. The subject matter of the said claim is not regarded as novel as for claim 1.

### **3) Inventive step Art. 33 (1) and (3) PCT**

Claims 1-16 do not fulfill the requirements of Art. 33 (1) - (3) PCT.

#### **Re Item VII**

##### **Certain defects in the international application**

There is a typing mistake in Claims 6 ("...as claimed I claim 3...").

#### **Re Item VIII**

##### **Certain observations on the international application**

1) Term such as "the spirit of the invention" on page 13 of the description is not clear (Art 5 PCT).

2) No reference is made to any of the relevant prior art documents as required by Rule 5.1 (a) ii PCT.

3) The subject matter of claim 16 is not clear and not defined in terms of technical

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/IB99/01700

features (Art. 6 PCT).

4) Expression such as "about" as in claim 8 is not clear (Art. 6 PCT).

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>A23L 3/005</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/24275</b> <b>(43) International Publication Date:</b> 4 May 2000 (04.05.00)
<b>(21) International Application Number:</b> PCT/IB99/01700 <b>(22) International Filing Date:</b> 18 October 1999 (18.10.99) <b>(30) Priority Data:</b> 98/4418 23 October 1998 (23.10.98) ZA <b>(71) Applicant (for all designated States except US):</b> RADICAL WATERS (PTY) LIMITED [ZA/ZA]; 3/458 West Street, Glen Austen Extension 3, 1685 Midrand (ZA). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> HINZE, Gilbert, Theo [ZA/ZA]; 119 Ostrich Road, Bromhof, 2194 Randburg (ZA). <b>(74) Agent:</b> LE ROUX, Marius; D.M. Kisch Inc., P.O. Box 781218, 2146 Sandton (ZA).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
<b>(54) Title:</b> BACTERICIDAL TREATMENT OF FOOD STORAGE CONTAINERS BY USING ELECTROCHEMICALLY ACTIVATED BACTERICIDAL AQUEOUS SOLUTION		
<b>(57) Abstract</b>  The invention relates to a method for bactericidal treatment of bulk food storage containers for fresh produce, the method including the step of treating a container with electrochemically activated, bactericidal aqueous solution.		

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>A23L 3/005</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/24275</b> <b>(43) International Publication Date:</b> 4 May 2000 (04.05.00)
<b>(21) International Application Number:</b> PCT/IB99/01700 <b>(22) International Filing Date:</b> 18 October 1999 (18.10.99) <b>(30) Priority Data:</b> 98/4418 23 October 1998 (23.10.98) ZA <b>(71) Applicant (for all designated States except US):</b> RADICAL WATERS (PTY) LIMITED [ZA/ZA]; 3/458 West Street, Glen Austen Extension 3, 1685 Midrand (ZA). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> HINZE, Gilbert, Theo [ZA/ZA]; 119 Ostrich Road, Bromhof, 2194 Randburg (ZA). <b>(74) Agent:</b> LE ROUX, Marius; D.M. Kisch Inc., P.O. Box 781218, 2146 Sandton (ZA).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
<b>(54) Title:</b> BACTERICIDAL TREATMENT OF FOOD STORAGE CONTAINERS BY USING ELECTROCHEMICALLY ACTIVATED BACTERICIDAL AQUEOUS SOLUTION		
<b>(57) Abstract</b>  The invention relates to a method for bactericidal treatment of bulk food storage containers for fresh produce, the method including the step of treating a container with electrochemically activated, bactericidal aqueous solution.		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

**BACTERICIDAL TREATMENT OF FOOD STORAGE CONTAINERS BY USING  
ELECTROCHEMICALLY ACTIVATED BACTERICIDAL AQUEOUS SOLUTION**

**TECHNICAL FIELD**

This invention relates to bactericidal treatment of bio-film in food storage containers. More particularly, the invention relates to bactericidal treatment of bio-film in bulk food storage containers used for fresh produce.

**BACKGROUND ART**

One of the problems with all fresh produce is their perishable nature and thus their limited shelf life. This is largely due to bacterial contamination and putrefactive enzyme production by the bacteria. A primary source of bacterial contamination is the bacterial bio-film that exists on the inside of bulk storage containers, such as those used on fishing trawlers.

For purposes of this specification, the term "fresh produce" shall be interpreted so as to include fresh foodstuff such as fish, chicken, meat, meat carcasses, processed meat products, processed chicken products, processed fish products and the like.

The use of bulk food storage containers for fresh fish such as those on fishing boats and trawlers, often constituted by the hulls themselves, travelling out to sea for lengthy periods on their fishing trips, is well known. As the fish are caught they are stored typically in crushed ice in the storage containers and hulls of trawlers and boats. Once



sufficient fish have been caught, the trawlers return to harbour where the fish are off-loaded and processed. In many cases much of the preliminary processing, such as "gutting", is done on board out at sea.

Through the storage of freshly caught fish in these hulls, the fish are exposed to bacterial contamination from the bio-film and the gut residue, thereby reducing the shelf life of the fish.

The use of other bulk food storage containers, such as those used on road and rail transporters for fresh produce such as cattle and sheep carcasses, is similarly well known. In these containers the bio-film on the inside of the storage hulls originates also from blood and gut residue as well as previously contaminated carcasses.

For purposes of this specification, the term "bulk food storage containers" shall be interpreted so as to include containers used for fresh produce such as fresh fish on trawlers, sheep and cattle carcasses on road transporters, rail transporters and the like, and associated terms shall be interpreted so as to have cognate meanings.

Further and for purposes of this specification, the term "transporter" shall be interpreted so as to include fishing ships and trawlers, bulk road

and rail transporters for fresh produce and the like.

### OBJECTIVES OF THE INVENTION

It is accordingly an object of the invention to increase the shelf life of fresh produce in bulk food storage containers by overcoming or at least minimising the above disadvantage.

### DISCLOSURE OF INVENTION

According to a first aspect of the invention there is provided a method for bactericidal treatment of bulk food storage containers for fresh produce, the method including the step of treating a container with electrochemically activated, bactericidal aqueous solution.

According to a second aspect of the invention there is provided fresh produce, characterised in that it has been treated with electrochemically activated, bactericidal aqueous solution during storage in a bulk food storage container.

According to a third aspect of the invention there is provided a bulk food storage facility, including a bulk food storage container, for fresh produce, the facility being characterised in that it includes means for producing electrochemically activated, bactericidal aqueous solution for

treating an internal surface of the container.

According to a fourth aspect of the invention there is provided a transporter, having a bulk food storage container for transporting fresh produce, the transporter being characterised in that it is provided with means for producing electrochemically activated, bactericidal aqueous solution.

The method may include the step of packing the fresh produce in ice in the container, the ice being characterised in that it is made from an electrochemically activated, bactericidal aqueous solution.

The transporter may be provided with means for providing the aqueous solution in iced form.

The electrochemically activated, bactericidal aqueous solution may be selected from the group consisting of mixed oxidant, anion-containing aqueous solution and mixed reductant, cation-containing aqueous solution.

The electrochemically activated, bactericidal aqueous solution may be prepared by means of electrolysis of an aqueous solution of a salt. The

salt may be sodium chloride. In particular, it may be non-iodated sodium chloride or potassium chloride.

The anion-containing solution and the cation-containing solution may be produced by an electrochemical reactor or so-called electrolysis device, having a through flow electrochemical cell with two co-axial cylindrical electrodes, with a co-axial diaphragm between them so as to separate an annular inter-electrode space into a catalytic and an analytic chamber. The anion-containing solution is referred to hereinafter for brevity as the "anolyte solution" or "anolyte" and the cation-containing solution is referred to hereinafter for brevity as the "catholyte solution" or "catholyte".

The electrochemically activated, bactericidal aqueous solution may be produced from an about 3 to 10% aqueous NaCl solution, electrolysed to produce mixed reductant and mixed oxidant species. These mixed oxidant and reductant species may be labile and after about 96 hours, the various radical species may disappear with relatively no residues being produced.

The anolyte solution may have a redox potential of about between +450mV and +1200mV and a pH of between 2 and 9. The anolyte

solution may include mixed oxidant species such as  $\text{ClO}$ ;  $\text{ClO}^-$ ;  $\text{HClO}$ ;  $\text{OH}^-$ ;  $\text{HO}_2^-$ ;  $\text{H}_2\text{O}_2$ ;  $\text{O}_3$ ;  $\text{S}_2\text{O}_8^{2-}$  and  $\text{Cl}_2\text{O}_6^{2-}$ .

These species have been found to have a synergistic anti-bacterial and/or anti-viral effect, which is generally stronger than that of chemical bactericides and has been found to be particularly effective against viral organisms and spore and cyst forming bacteria.

The catholyte solution generally may have a pH of between about 12 and 13 and a redox potential of between about -850mV and -900mV. The catholyte solution may include mixed reductant species such as  $\text{OH}^-$ ;  $\text{H}_3^-$ ;  $\text{O}_2$ ;  $\text{H}_2$ ;  $\text{HO}_2$ ;  $\text{HO}_2^-$  and  $\text{O}_2^-$ .

According to a fifth aspect of the invention there is provided equipment for use in a method for bactericidal treatment of bulk storage containers for fresh produce, the apparatus including an electrolysis device, having a through flow electrochemical cell with two co-axial cylindrical electrodes, with a co-axial diaphragm between the two electrodes so as to separate an annular inter-electrode space into a catalytic and an analytic chamber.

Both the physical characteristics of the anolyte and the catholyte, such as pH and redox potential, are adjustable so as to be suitable for a

particular application, such as type of produce, the atmospheric conditions in the container and the like.

### BEST MODES FOR CARRYING OUT THE INVENTION

A preferred embodiment of the invention will now be described as a non-limiting example only.

#### Example 1 :

By using anolyte, it is envisaged that one can achieve an increased shelf life for fish of up to 3 to 9 days. The proposed application of anolyte is as follows:

- (a) As ice for storage purposes; and
- (b) As a method of eliminating the bio-film on the inside surfaces of bulk storage containers such as those on fishing trawlers and boats.

#### 1.1 Ice

By using anolyte in the form of ice in the storage of fish, the bacterial contamination in the ice is eliminated as well as the contamination of the packed fish. As the ice melts, the anolyte is released to destroy the bacteria.

## 8

It is envisaged that the anolyte can be iced either as a concentrate, or in a diluted state with water, varying in dilution from 50% to as low as 20% dilution. The dilution would depend largely upon the contaminated state of the water used in the ice. Some trawlers, for example, use seawater in their ice. Seawater by nature is very contaminated.

The type of anolyte to be used in the ice is :

pH	-	$\pm 7.5$ ;
Amps	-	12 - 13 amps (24 volt);
ORP	-	$\pm 450$ mV; and
Pressure	-	0.5 bar (720ml/hr – production rate)

### 1.2 Bio Film:

Through applying anolyte as a fog within an empty storage container of a trawler, one could eliminate the bio-film and thus the risk of re-contamination of the fish during subsequent use.

The elimination of this bio-film will generally take place between fishing trips, while the trawler is in the harbour with its storage containers empty.

It is envisaged that various methods of application such as fogging could be applied, as long as the droplet size of the fogged analyte is small (around 4 to 12 micrometers) and the contact time is sufficient. Depending upon the extent of the bio-film, a number of fogging sessions could be required.

Fogging time will also depend upon the size and volume of the container and the output of the fogging apparatus. Generally, one will fog until a thick fog has formed in the closed container and the walls of the container have been sufficiently wet by the analyte fog so that droplets begin to form and run off (run-off stage). The container would then be allowed to dry before being fogged again.

It is envisaged that the type of analyte to be used could be:

PH	-	$\pm 6.5$ ;
Amps	-	12 - 13 amps (24 volts);
ORP	-	$\pm 750\text{mV}$ ; and
Pressure	-	0.5 bar ( $\pm 750$ ml/hr - output)



It is envisaged that it could be advantageous also to use anolyte as a general disinfectant in the processing and putting of the fish, of both the process facilities and equipment and the product itself.

Anolyte has very limited residue and thus an advantageous over the other disinfectants on the market that are generally chemically based.

Example 2 :

Multiple fogging cycles were used so as to determine the efficacy thereof on the total bacterial surface loads in a series of chillers over a 42 hour chilling period.

Samples 1, 2 and 3 were carcasses fogged separately in chillers with 30 minute intervals. Samples 4 and 5 were carcasses sampled in operating chillers. Foggers were put on the floor of the chillers and carcasses were therefore not fogged directly. 3 x sampling was conducted 42 hours after the previous fogging on all samples so as to establish whether there would be an increase in bacterial loads over the 42 hours prior to de-boning.

Multiple fogging in areas where the fog is not mechanically removed from

the room during the fogging process is highly effective in reducing total counts.

Fogging in operating chillers is not effective.

Throughout the trial Coliform counts were low, most probably due to carcass washing and results therefore were not given.

Example 3:

Enclosed volumes containing diverse equipment, including 2 tables and a scale, were fogged so as to determine the microcidal effect of anolyte on the enclosure surfaces and the enclosed equipment. The results are shown in the accompanying tables.

Example 4 :

Cattle carcasses were treated at the Agricultural Research Council Unit, Irene, Gauteng, South Africa.

The anolyte used was generated under and with the following characteristics :

Current : 10 Ampere; Voltage : 24 Volt

ORP : +762 mV; TDS; 6,04 g/l

PH : 6,8

The chiller treated had volume (space) for about 16 carcasses. The fogging process consisted of 3 cycles of 20 minutes each, with 10 minutes in between each cycle.

Samples were taken from the neck area, the breast area, the back area and the hindquarter area.

Samples were taken of all micro-organisms by means of total plate count ( Redoc plates), total plate counts (petri film) and Coliforms (petri film).

The results are shown in the accompanying tables.

Example 5 :

A number of 800 lamb carcasses were subjected to tests, 400 being fogged with anolyte and 400 being used as the control group. Samples

were taken before treatment, after a second cycle and a fourth cycle, while the control group was sampled before and after 24 hours of chilling.

Additional samples were taken from both the treated and the control group for measuring TPC only.

The results are shown in the accompanying tables.

It will be appreciated that many variations in detail are possible without departing from the scope and/or spirit of the invention as claimed in the claims hereinafter.

**Example 2:** (New Style P rk)**Objective:**

To determine the effect of multiple fogging on the total bacterial surface loads over a 42 hour chilling period.

1	Colony Forming units / 10cm Fogging frequency				Efficacy		Log red.	Analyte production Parameters	
	No.	Control	1x	2x	3x(+36h)	% Red.		Amp	pH
	169	TNTC	12	5	7	99.9	-6	9	6.66
	236	TNTC	360	3	1	99.9	-6		
	168	600	6	3	1	99.9	-2		
	246	110	120	2	1	99.9	-2		
	170	13	3	70	0	99.9	-1		
	99.7	-3.4						24V	1.0 Bar
2	189	12	7	1	30	0	0	12	6.8
	203	100	8	15	0	99.9	-2		
	200	140	13	1	0	99.9	-2		
	192	80	2	35	2	97.5	-1		
	232	200	6	80	0	99.9	-2		
	79.4	-1.4						24V	1.0 Bar
3	193	TNTC	100	3	2	99.9	-6	10	5.0
	177	2	30	20	10	0	0		
	178	110	70	50	24	78.2	-1		
	179	13	10	6	1	92.3	-1		
	180	110	22	11	2	98.2	-2		
	73.7	-1.8						24V	1.0 Bar
4	200	1	4	-	2	0	0	11	5.0
	211	8	100	-	50	0	0		
	1304	5	1	-	0	99	0		
	194	5	8	-	2	40	0		
	245	3	4	-	1	33	0		
	34.4	0						24V	1.0 Bar
5	58	1	210	-	TNTC	0	0	9	6.66
	106	160	120	-	12	92	-2		
	68	6	4	-	3	50	-1		
	94	2	60	-	4	0	0		
	32	110	90	-	70	27	-1		
	33.8	.08						24V	1.0 Bar

**Comments**

1, 2 and 3 were fogged separately in chillers with 30 minutes intervals.  
Chillers were not in operation. After fogging, carcasses were returned to original chillers.

**Example 3 :****Microcidal Effect of Anolyte on Surfaces and Equipment**

Surface area	Before cfu/24cm <sup>2</sup>	After cfu/24cm <sup>2</sup>
Table 1	3	4
Scale	125	27
Floor	33	2
Table 2	31	2
Wall	0	0
Hands	21	0
Saw (Only anolyte was used)	7	0
Table (Only anolyte was used)	10	0

Example 4: (Calf Carcasses)

The test conditions were as follows:

ANOLYTE :

10 Amp  
24 volt  
+ 762 mV ORP  
6.04g/l TDS  
6.8pH

Chiller capacity :

No. of carcass in chiller

16

Fogging:

3 x 20 min (10 min rest in between)

Samples taken:

Neck area, breast are, back area, hindquarter area

Mico-organisms:

Total plate count (Rodac plates)

Total plate counts (petri film)

Coliforms (petri film)

Direct fogging in chiller with interrupted air circulation during the fogging process

A. Trial Carcasses

CFU/10cm <sup>2</sup> – Total Aerobic Count Petri film					
	Before	1 x	2 x	3 x	4 x
V1 Right	168	38	22	18	8
Left		62	---	0	---
V2 Right	58	33	---	2	4
Left		59	---	18	---
V3 Right	330	63	25	0	106
Left		123	---	2	---
V4 Right	156	56	58	8	154
Left		140	---	20	---
V5 Right	220	72	78	19	130
Left		47	---	12	---
V6 Right	175	112	110	16	160
Left		46	---	18	---
Mean R	185	62	59	11	94
L		79	---	12	---
% Decrease		-62	-68	-94	-51

\* Comments:

The fourth Swab was on the side of the triceps cut where all carcasses had been pushed by hand and were therefore more contaminated than adjoining surfaces.

All swabs were incubated at 37° C for 48 hours  
Coliform counts were negligible on all carcasses

- B. Negative Control : **Indirect** fogging of carcasses that were present in the chiller, during the time of the experiment. Only final carcass counts on similar locations as the trials were taken.

#	CFU/10cm <sup>2</sup>
1	17
2	24
3	5
4	55
5	68
6	14
7	3
Mean	27



**Example 5:****Woolworths Trial 800 lamb carcasses****Results:****Treatment with Anolyte**

Carcase #	Before treatment			After 2 <sup>nd</sup> fogging			After 4 <sup>th</sup> fogging		
	TPC	Coliform	E.coli	TPC	Coliform	E.coli	TPC	Coliform	E.coli
B33537	180	0	0	-	-	-	0	1	0
B28392	28	0	0	-	-	-	0	0	0
B29673	27	0	1	9	0	0	5	0	0
B30680	19	0	0	0	0	0	0	0	0
B32522	190	14	0	-	-	-	0	0	0
B29535	3	0	0	4	0	0	0	0	0
B28258	18	0	2	5	0	0	1	0	0
B29602	600	0	0	-	-	-	3	0	0
B29505	23	0	0	8	0	0	2	0	0
B28659	25	0	0	-	-	-	0	0	0
<b>Total</b>	<b>1113</b>	<b>14</b>	<b>3</b>	<b>26</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>1</b>	<b>0</b>
<b>Mean/ 20cm<sup>2</sup></b>	<b>111.3</b>	<b>1.4</b>	<b>0.3</b>	<b>5.2</b>	<b>0</b>	<b>0</b>	<b>1.1</b>	<b>0.1</b>	<b>0</b>

**Control group:**

Carcase #	Before Chilling				After chilling 24 hrs
	TPC	Coliform	E.coli		TPC
C32592	21	6	0		17
C28363	38	0	0		27
C29469	11	23	0		15
C32540	84	2	0		166
C28309	17	0	0		48
C29137	614	0	0		228
C28588	9	0	0		123
C33039	0	0	0		0
C28333	38	1	1		179
C30032	2	0	0		0
<b>Total</b>	<b>834</b>	<b>32</b>			<b>803</b>
<b>Mean/ 20cm<sup>2</sup></b>	<b>83</b>	<b>3.2</b>	<b>0</b>		<b>80</b>

Further swabs were taken on the shoulder of 5 chilled and fogged carcasses (after the 4<sup>th</sup> fogging).

Carcase #	TPC
4BS1	1
4BS2	3
4BS3	0
4BS4	6
4BS5	6
<b>Total</b>	<b>16</b>
<b>Mean/20cm<sup>2</sup></b>	<b>3.2</b>

## CLAIMS

1. A method for bactericidal treatment of bulk food storage containers for fresh produce, the method including the step of treating a container with electrochemically activated, bactericidal aqueous solution.
2. Fresh produce, characterised in that it has been treated with electrochemically activated, bactericidal aqueous solution during storage in a bulk food storage container.
3. A bulk food storage facility, including a bulk food storage container for fresh produce, the facility being characterised in that it includes means for producing electrochemically activated, bactericidal aqueous solution for treating an internal surface of the container.
4. A transporter, having a bulk food storage container for transporting fresh produce, the transported being characterised in that it is provided with means for producing electrochemically activated, bactericidal aqueous solution.

5. A method as claimed in claim 1, including the step of packing the fresh produce in ice in the container, the ice being characterised in that it was made from the electrochemically activated, bactericidal aqueous solution.
6. A bulk food storage facility as claimed in claim 3, characterised in being provided with means for producing the aqueous solution in iced form.
7. A method as claimed in claim 1, wherein the aqueous solution is selected from a group consisting of mixed oxidant, anion-containing solution and mixed reductant, cation-containing solution.
8. A method as claimed in claim 7 wherein the solution is produced from an about 3 to 10% aqueous salt solution, electrolysed to produce mixed reductant and mixed oxidant species.
9. A method as claimed in claim 8 wherein the salt solution is sodium chloride or potassium chloride solution.

10. A method as claimed in claim 1 wherein the electrochemically activated, bactericidal aqueous solution is anion-containing solution is produced by an electrolysis device, having a through flow electrochemical cell with two co-axial cylindrical electrodes, with a co-axial diaphragm between the two electrodes so as to separate an annular inter-electrode space into a catalytic and an analytic chamber.
11. A method as claimed in claim 8 wherein the species are labile and wherein they, after about 96 hours, disappear with relatively no residues being produced.
12. A method as claimed in claim 7 wherein the anion-containing solution has a redox potential of between about +450 mV and + 1200 mV and a pH of between about 2 and 9.
13. A method as claimed in claim 7 wherein the anion-containing solution includes mixed oxidant species selected from the group consisting of  $\text{ClO}$ ;  $\text{ClO}^-$ ;  $\text{HClO}$ ;  $\text{OH}^-$ ;  $\text{HO}_2^-$ ;  $\text{H}_2\text{O}_2$ ;  $\text{O}_3$ ;  $\text{S}_2\text{O}_8^{2-}$  and  $\text{Cl}_2\text{O}_6^{2-}$

14. A method as claimed in claim 7 wherein the cation-containing solution has a pH of between about 7 and 13 and a redox potential of between about -200 mV and -900 mV.
15. A method as claimed in claim 7 wherein the cation-containing solution includes mixed reductant species selected from the group consisting of  $\text{OH}^-$ ;  $\text{H}_3^-$ ;  $\text{O}_2$ ;  $\text{H}_2$ ;  $\text{HO}_2^-$ ;  $\text{HO}_2^-$  and  $\text{O}_2^-$ .
16. A method as claimed in claim 1 wherein the physical characteristics of the anion-containing and the cation-containing solution are adjustable so as to be suitable for the particular application.

# INTERNATIONAL SEARCH REPORT

onal Application No

PCT/IB 99/01700

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 A23L3/005

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 802 164 A (MORINAGA ENGINEERING CO LTD ;MORINAGA MILK INDUSTRY CO LTD (JP)) 22 October 1997 (1997-10-22)	1-16
Y	page 1, line 5 - line 14 page 6, line 54 - line 55 ----	1-16
X	DATABASE WPI Section Ch, Week 198113 Derwent Publications Ltd., London, GB; Class A97, AN 1981-22787D XP002130880 & SU 747 828 B (VESELOV YU S), 25 July 1980 (1980-07-25) abstract ----- -/--	1-4, 10-12, 15,16



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

18 February 2000

Date of mailing of the international search report

29/02/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Bendl, E

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 99/01700

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE WPI  Section Ch, Week 199333  Derwent Publications Ltd., London, GB;  Class D13, AN 1993-263108  XP002130881  &amp; SU 1 752 401 A (MOSKOVSKOE ASSEMBLY  MANAGEMENT), 7 August 1992 (1992-08-07)</p>	1,2,7-16
Y	abstract	1-16
X	<p>PATENT ABSTRACTS OF JAPAN  vol. 1995, no. 11,  26 December 1995 (1995-12-26)  &amp; JP 07 218062 A (OKAMOTO:KK),  18 August 1995 (1995-08-18)  abstract</p>	1-6,10, 11,16
X	<p>DATABASE WPI  Section Ch, Week 199624  Derwent Publications Ltd., London, GB;  Class B06, AN 1996-237818  XP002130882  &amp; RU 2 045 480 C (RYASNOV N I),  10 October 1995 (1995-10-10)  abstract</p>	1-16
X	<p>DATABASE WPI  Section Ch, Week 199439  Derwent Publications Ltd., London, GB;  Class D13, AN 1994-312796  XP002130883  &amp; JP 06 237747 A (HOSHIZAKI ELECTRIC CO  LTD), 30 August 1994 (1994-08-30)  abstract</p>	1,2,7-16
Y	<p>PATENT ABSTRACTS OF JAPAN  vol. 1997, no. 04,  30 April 1997 (1997-04-30)  &amp; JP 08 323307 A (TOTO LTD),  10 December 1996 (1996-12-10)  abstract</p>	1-16
X	<p>PATENT ABSTRACTS OF JAPAN  vol. 1997, no. 11,  28 November 1997 (1997-11-28)  &amp; JP 09 187770 A (NAKAMURA  TADAMASA;ZENKOKU MOKKO KIKAIKAN:KK),  22 July 1997 (1997-07-22)  abstract</p>	1-16
E	<p>&amp; US 5 858 202 A (NAKAMURA)  column 1 -column 4</p>	1-16

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 99/01700

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0802164 A	22-10-1997	WO 9717298 A JP 10128336 A	15-05-1997 19-05-1998
SU 747828 B		NONE	
SU 1752401 A	07-08-1992	NONE	
JP 07218062 A	18-08-1995	NONE	
RU 2045480 C	10-10-1995	NONE	
JP 6237747 A	30-08-1994	NONE	
JP 08323307 A	10-12-1996	NONE	
JP 09187770 A	22-07-1997	US 5858202 A	12-01-1999